

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION**

CUMMINS-ALLISON CORP., an)
Indiana Corporation,)

Plaintiff,)

v.)

GLORY, LTD., a Japanese Corporation,)
GLORY SHOJI CO., INC., a Japanese)
Corporation and GLORY (U.S.A.), INC.,)
a California Corporation,)

Defendants.)

No. 02 C 7008

Judge Ronald A. Guzmán

MEMORANDUM OPINION AND ORDER

Cummins-Allison Corp. has sued Glory, Ltd., Glory Shoji Co., Inc. and Glory (U.S.A.), Inc. (collectively, "Glory") for infringement of U.S. Patent No. 5,295,196 ("the '196 patent"). Defendants have filed a motion pursuant to Federal Rule of Civil Procedure 56(c) for summary judgment on the issue of infringement. For the reasons set forth below, the motion is granted.

Background¹

Plaintiff is a corporation that manufactures currency discrimination devices, *i.e.* machines that count and determine the denomination of currency. Plaintiff is the holder of a number of patents relating to currency denominating methods and devices, including the '196 patent at issue in this case.

Defendant Glory Ltd. is a Japanese corporation that manufactures currency denominating devices. Defendant Glory Shoji is a Japanese subsidiary of Glory Ltd., which ships its parent's products to defendant Glory (U.S.A.), Inc., which sells the products. Among the products defendants manufacture and sell are Glory models GFR-S60, GFR-S80 and GFR-S90 ("the Glory S machines").

Plaintiff contends that the Glory S machines infringe the '196 patent either literally or under the doctrine of equivalents. Glory argues that, if the claims of the patent are properly construed, its S machines do not infringe under either theory.

The Legal Standard

To prevail on a summary judgment motion, "the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, [must] show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law." FED. R. CIV. P. 56(c). At this stage, we do not weigh evidence or determine the truth

¹The extensive factual background of this case is set forth more fully in the February 10, 2003 Report and Recommendation of Magistrate Judge Schenkier on plaintiff's motion for a preliminary injunction and this Court's September 2, 2003 Memorandum Opinion and Order adopting the Magistrate Judge's Report and Recommendation. Those facts will not be repeated here.

of the matters asserted. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 249 (1986). We view all evidence and draw all inferences in favor of the non-moving party. *Michas v. Health Cost Controls of Ill., Inc.*, 209 F.3d 687, 692 (7th Cir. 2000). Summary judgment is appropriate only when the record as a whole establishes that no reasonable jury could find for the non-moving party. *Id.*

Discussion

The Court uses a two-step analysis to determine whether a patent is infringed. First, we determine the scope of the patent claims. *Crystal Semiconductor Corp. v. TriTech Microelectronics Int'l, Inc.*, 246 F.3d 1336, 1345 (Fed Cir. 2001). Then, we compare the properly construed claims to the allegedly infringing product. *Id.*

To determine the meaning of the patent's claims, the Court "look[s] first to the intrinsic evidence of record, *i.e.* the patent itself, including the claims, the specification and, if in evidence, the prosecution history." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). The Court may turn to extrinsic evidence, like expert testimony, only if the intrinsic evidence alone "is insufficient to enable the court to determine the meaning of the asserted claims." *Id.* at 1584.

Claim Construction

Plaintiff contends that the Glory S machines infringe claims 1-3, 6, 8-11, 13, 16 and 18 of the '196 patent. (Pl.'s LR 56.1(b)(3)(B) Stmt. ¶ 1.) We will focus on claim 1, however, because it is the only independent claim in the patent. *See Wahpeton Canvas Co., Inc. v. Frontier, Inc.*, 870 F.2d 1546, 1552 n.9 (Fed. Cir. 1989) ("One who does not infringe an independent claim cannot infringe a claim dependent on (and thus containing all the limitations of) that claim.").

In claim 1, plaintiff claims:

A currency counting and evaluation device for receiving a stack of currency bills, rapidly counting and evaluating all the bills in the stack, and then re-stacking the bills, said device comprising:

a feed mechanism for receiving a stack of currency bills and feeding said bills in the direction of the narrow dimension of the bills, one at a time, to a feed station,

a bill transport mechanism for transporting bills, in the direction of the narrow dimension of the bills, from said feed station to a stacking station, at a rate in excess of about 800 bills per minute,

a stationary optical scanning head located between said feed and stacking stations for scanning a preselected segment of a central portion of each bill transported between said stations by said transport mechanism, said scanning head including at least one light source for illuminating a strip of said preselected segment of a bill, and at least one detector for receiving reflected light from the illuminated strip on the bill and producing an output signal representing variations in the intensity of the reflected light,

means for sampling said output signal at preselected intervals as a bill is moved across said scanning head in the direction of the narrow dimension of the bill, each of said output samples being proportional to the intensity of the light reflected from a different strip of said preselected segment of a bill,

a memory for storing characteristic signal samples produced by scanning said preselected segments of bills of different denominations with said scanning head and sampling said output signal at said preselected intervals, each of said stored signal samples being proportional to the intensity of the light reflected from a different strip of said preselected segment of a bill, and

signal processing means for receiving said signal samples and (1) determining the denomination of each scanned bill by comparing said stored signal samples with said output signal samples produced by the scanning of each bill with said scanning head, (2) counting the number of scanned bills of each denomination, and (3) accumulating the cumulative value of the scanned bills of each denomination.

(Brian Anderson Decl. (hereafter, “Anderson Decl.”), Ex. H, ‘196 Patent, Claim 1, Col. 31, l. 43-Col. 32, l. 21.) Glory says that claim 1, properly construed, discloses a device that: (1) has only one transport path and one output pocket; (2) scans the geometric center of each bill; (3) produces and stores master characteristic patterns proportional to the intensity of light reflected from the scanned bill; and (4) uses a central processing unit (“CPU”) to perform the correlation algorithm disclosed in the patent. We will address each contention in turn.

A Single Transport Path & Output Pocket

According to Glory, the limitation of only one transport path and output pocket is evident from the plain language of the claim. Specifically, Glory says that the claim’s reference to “a bill transport mechanism” and “a stacking station,” (*see id.*, Claim 1, Col. 31, ll. 51-54 (“a bill transport mechanism for transporting bills, in the direction of the narrow dimension of the bills, from said feed station to a stacking station, at a rate in excess of about 800 bills per minute”)), describes one transport path and one output pocket. Plaintiff, of course, disagrees. In its view, the use of the singular in this open-ended claim means one or more, not just one.

The Federal Circuit agrees with plaintiff. As it stated in *Crystal Semiconductor Corp.*, 246 F.3d at 1347: “This court has consistently emphasized that the indefinite articles ‘a’ or ‘an,’ when used in a patent claim, mean ‘one or more’ in claims containing open-ended transitional phrases such as ‘comprising.’ Under this conventional rule, the claim limitation ‘a,’ without more, requires *at least one*.” (citations omitted) (emphasis in original). Thus, standing alone, the claim language does not limit the claimed device to a single output pocket and transport path.

Claim interpretation does not, however, end with the claim language. Rather, claims “must be read in view of the specification.” *Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1347 (Fed. Cir.), *cert. denied*, 125 S. Ct. 61 (2004). We cannot graft a limitation from the specification onto the claim, but if the specification:

“makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification, might be considered broad enough to encompass the feature in question.”

Id. (quoting *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1341 (Fed. Cir. 2001)).

The specification of the ‘196 patent repeatedly describes the invention as having one transport path and one output pocket. (*See, e.g.*, Anderson Decl., Ex. H, ‘196 Patent, Col. 3, ll. 63-68 (“The apparatus incorporates an abbreviated curved transport path for accepting currency bills that are to be counted and transporting the bills about their narrow dimension across a scanhead located downstream of the curved path and into a conventional stacking station where sensed and counted bills are collected.”); *id.*, Col. 5, ll. 61-63 (“The scanned bill is then transported to a bill stacking station . . . where bills so processed are stacked for subsequent removal.”); *id.*, Col. 15, ll. 58-62 (“According to an important feature of the present invention, . . . a scanned bill identified as a ‘no-call’ is transported directly to the top of the system stacker”); *id.*, Col. 17, ll. 21-24 (“Subsequently, the bad bill B1 is guided to the stacker while, at the same time, the following test bill B2 is brought under the optical scanhead and subjected to the scanning and processing steps.”); *id.*, Col. 22, ll. 61-64 (“The bill transport path includes a curved guideway . . . for accepting currency bills that have been propelled forward along the input path”); *id.*, Col. 23, ll. 21-22

("Downstream of the curved section . . . , the bill transport path has an output path for currency bills."); *id.*, Fig. 1 (depicting one transport path and one stacking station).)

Plaintiff says these references simply describe the preferred embodiment. An alternative embodiment, plaintiff says, is disclosed by claim 18:

The currency counting and evaluation device of claim 1 which includes signal processing means responsive to the output signals from said detector for determining the denomination of each scanned bill before that bill has been advanced to a stacking station, and

means responsive to said signal processing means for altering the movement of a scanned bill in response to the denomination determination for that bill, before that bill is advanced to a stacking station.

(*Id.*, Claim 18, Col. 34, ll. 11-19.) In plaintiff's view, the latter part of that claim necessarily refers to an embodiment in which spurious, or "no-call," bills are diverted via a branched transport path to a separate stacker bin because "that is the only embodiment in which the movement of the bill is 'altered . . . before the bill is advanced to a stacking station.'" (Pl.'s Mem. Opp'n Defs.' Mot. Partial Summ. J. '196 Patent at 10 (quoting Claim 18).)

Read in light of the specification, however, claim 18 is not necessarily limited to an embodiment with a branched transport path and separate stacker bin. Rather, the preferred embodiment described in the specification also "alter[s] the movement of a scanned bill in response to the denomination determination for that bill, before that bill is advanced to a stacking station," as the claim recites. In the preferred embodiment, after a bill is identified as a no call, the currency recognition unit decelerates, such that the bill following the no-call (bill 2) is stopped on the transport path between the scanhead and the stacker after it has been scanned and its denomination has been determined. (See Anderson Decl., Ex. H, '196 Patent, Col. 16, ll. 1-60.) In other words,

in the preferred embodiment, the movement of bill 2 is “alter[ed],” *i.e.* slowed and stopped, “in response to,” *i.e.* only after, the denomination of that bill has been determined. (*Id.*, Claim 18, Col. 34, ll. 11-19.) Given the specification, we are not persuaded that claim 18 necessarily recites an embodiment with more than one transport path and more than one output pocket.

That does not mean that the specification supports only the interpretation urged by Glory. As plaintiff points out, most of the references to a single path and stacker appear in the description of the preferred embodiment, and it is well settled that the preferred embodiment does not limit the claims. *See Vulcan Eng'g Co., Inc. v. Fata Aluminum, Inc.*, 278 F.3d 1366, 1376 (Fed. Cir. 2002) (“This court has often explained that the claims . . . are not limited to a designated ‘preferred embodiment’ unless that embodiment is in fact the entire invention presented by the patentee.”) Moreover, the specification is not entirely silent on the subject of multiple paths and stackers. At one point, it states: “Another advantage accruing from the reduction in processing time realized by the present sensing and correlation scheme is that the response time involved in either stopping the transport of a bill that has been identified as “spurious” . . . or diverting such a bill to a separate stacker bin, is correspondingly shortened.” (Anderson Decl., Ex. H, ‘196 Patent, Col. 18, ll. 29-36.)

Moreover, the doctrine of claim differentiation supports plaintiff’s interpretation. “Under the doctrine of claim differentiation, each claim in a patent is presumptively different in scope.” *Wenger Mfg., Inc. v. Coating Mach. Sys., Inc.*, 239 F.3d 1225, 1233 (Fed. Cir. 2001). The doctrine has particular application when “there is a dispute over whether a limitation found in a dependent claim should be read into an independent claim, and that limitation is the only meaningful difference between the two claims.” *Id.* As plaintiff notes, claims 14 and 15, which depend on claim 1, recite “the embodiment that ‘stops’ on a no-call bill,” thus contemplating only one path and one stacker.

(Pl.'s Mem. Opp'n Defs.' Mot. Partial Summ. J. '196 Patent at 8.) Consequently, the doctrine of claim differentiation suggests that claim 1 be read more broadly to include the alternative embodiment that "diverts, rather than stops on, no-call bills," an embodiment that contemplates more than one path and stacker. (*Id.* at 9.)

Because the claim language and specification of the '196 patent are equivocal on whether claim 1 includes a limitation of a single path and output pocket, we turn to the last source of intrinsic evidence, prosecution history, for guidance. We can look not only to the prosecution history for the '196 patent, but to that of any related patents as well. *See Microsoft Corp.*, 357 F.3d at 1349-50 (stating that prosecution history of related patents may be used to interpret claims in patent-in-suit).

There is nothing in the prosecution history of the '196 patent that addresses these issues. (*See generally* Manuel Nelson Decl. Supp. Defs.' Mot. Partial Summ. J. '196 Patent (hereafter, "Nelson Decl."), Ex. 4, Prosecution History '196 Patent.) The prosecution history of U.S. Patent No. 5,692,067 (the "067 patent"), which descended from the '196 patent, however, is more illuminating. The '067 patent claims an improved method and apparatus for discriminating between currency of different denominations. When plaintiff submitted the application for that patent, the PTO rejected proposed claims 34-113 under "the judicially created doctrine of double patenting" over claim 1 of the '196 patent because:

[t]he subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: a currency counting and evaluation device and method comprising: a feed mechanism for receiving stack of bills; **at least one output receptacle** for receiving the bills; transport mechanism for transporting the bills; optical scanning head for scanning a preselected segment of a central portion of each bill; means for sampling the output signal at preselected intervals; a memory for storing characteristic signal samples; signal processing means for determining the denomination of each scanned bill; counting the number of scanned bills;

accumulating the value of scanned bills; means for flagging a bill when the identity of the bill can not be determined.

(*Id.*, Ex. 5, Prosecution History '067 Patent at GL047355-56) (emphasis supplied). Plaintiff did not take issue with the examiner's characterization of claim 1 of the '196 patent. Rather, it filed a terminal disclaimer to overcome the double-patenting rejection. (*Id.* at GL047395-96.) This exchange between plaintiff and the PTO strongly suggests that neither entity viewed claim 1 of the '196 patent as being limited to a single transport path and a single output pocket.

Glory says there is other evidence in the prosecution history of the '067 patent that vitiates that suggestion. To overcome the patent examiner's rejection of various claims as obvious in view of the O'Maley patent and other prior art, plaintiff emphasized that the device claimed in the application for the '067 patent had only a single output pocket: "[C]laims 34-45, 86-90, and 97-113 are distinguishable because they contain the limitations of a single output receptacle and a discriminating unit. O'Maley teaches the use of at least two output receptacles" (*Id.* at GL047388; *see id.* at GL07392 ("[T]he references cited by the examiner (O'Maley and Jones) coexisted since 1979. That is over a decade . . . before the Applicants filed their application disclosing a single output pocket discriminator."); *id.* ("De La Rue was also offering a multipocket discriminator in 1980.")) Because the '067 patent is related to the '196 patent and they share a common specification, Glory says these admissions by plaintiff apply equally to the claims of the '196 patent.

Glory's argument ignores the context in which plaintiff's comments were made. Plaintiff made those statements to persuade the examiner to withdraw his obviousness rejections to claims 34-45, 86-90, and 97-113 of the application, all of which contain the express limitation of a single

output pocket. (*See id.* at GL047304-07, GL047343-44, GL047349-51.) By contrast, none of the claims of the '196 patent contains such an express limitation. Given that distinction, plaintiff's comments to the PTO shed no light on the proper scope of the claims of the '196 patent.

Even if plaintiff intended claim 1 to disclose devices with multiple paths and pockets, Glory says that it did not succeed because the patent does not enable a device with those features. Every patent must "enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same." 35 U.S.C. § 112, ¶ 1. "To be enabling, the specification of the patent must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation." *Plant Genetic Sys., N.V. v. DeKalb Genetics Corp.*, 315 F.3d 1335, 1339 (Fed. Cir. 2003) (internal quotation omitted).

That is not to say that the specification itself must necessarily describe how to make and use every possible variant of the claimed invention, for the artisan's knowledge of the prior art and routine experimentation can often fill gaps, interpolate between embodiments, and perhaps even extrapolate beyond the disclosed embodiments, depending upon the predictability of the art. But it does mean that, when a range is claimed, there must be reasonable enablement of the scope of the range.

AK Steel Corp. v. Sollac & Ugine, 344 F.3d 1234, 1244 (Fed. Cir. 2003) (citations omitted).

The Court disagrees with Glory's assertion that the specification of the '196 patent enables only a device with a single transport path and a single output pocket. Though the specification says little about the multiple path, multiple pocket embodiment, the evidence establishes that the specification would have been sufficient to enable a person skilled in the art of designing currency processing devices to construct that embodiment. There is no dispute that currency sorting or counting devices that diverted bills to multiple stacking stations existed in May 1992, when the application for the '196 patent was filed. (*See, e.g.* Nelson Decl., Ex. 8, U.S. Patent No. 4,179,685

(“O’Maley Patent”), Col. 4, ll. 25-28 (describing “a sorter [with] a plurality of bins” and “[s]lideways . . . to guide the bills . . . into the appropriate bin”); *id.*, Ex. 5, Prosecution History ‘067 Patent at GL047389 (statement by plaintiff to PTO that O’Maley currency discriminator “routes reject bills into a separate output bin”); *id.* at GL047392 (statement by plaintiff to PTO that De La Rue had been selling multipocket discriminators since 1980).) Moreover, plaintiff’s expert, John DiBlasio, opines, without contradiction from Glory, that such counters and sorters were known to and understood by those skilled in the art well before 1992. (Anderson Decl., Ex. E, John DiBlasio Decl. Supp. Pl.’s Mem. Opp’n Defs.’ Mot. Partial Summ. J. ‘196 Patent ¶ 22.) Given that evidence, the Court concludes that the specification of the ‘196 patent sufficiently enables the multi-path, multi-pocket embodiment of the claimed device.

In sum, properly construed, claim 1 of the ‘196 patent does not contain the limitation of a single transport path and a single output pocket.

Scanning the Central Portion of Each Bill

In relevant part, claim 1 states that the patented device has: “a stationary optical scanning head located between said feed and stacking stations for scanning a preselected segment of a central portion of each bill.” (*Id.*, Ex. H, ‘196 Patent, Claim 1, Col. 31, ll. 55-57.) Glory says that language requires the patented device to scan the geometric center of each bill because: (1) the word “central” is commonly understood to mean geometric center; (2) two figures in the patent show the device scanning the geometric center of a bill; and (3) the prosecution histories of the ‘196 patent and related patents indicate that plaintiff equated “central portion” with geometric center.

Contrary to Glory's belief, the word "center" is not necessarily understood as geometric center. Though that is one definition of the word, so is "a part of an object that is surrounded by the rest." THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE (4th ed. 2000). Thus, "central portion" could be understood either as a part of the geometric center of a bill or part of the interior of the bill.

The specification of the patent is also equivocal on the meaning of that phrase. As Glory points out, Figures 1 and 1A of the '196 patent depict the device scanning the geometric center of each bill. The rest of the patent, however, suggests that the invention is not so limited. The specification states that the scanning technique involves: "detect[ing] the starting point of the printed pattern on the bill, as represented by the thin borderline . . . which typically encloses the printed indicia on currency bills." (Anderson Decl., Ex. H, '196 Patent, Col. 6, ll. 65-68.) Detection of the borderline is important, the specification says, because:

the borderline serves as an absolute reference point for initiation of sampling. If the edge of a bill were to be used as a reference point, relative displacement of sampling points can occur because of the random manner in which the distance from the edge to the borderline varies from bill to bill due to the relatively large range of tolerances permitted during printing and cutting of currency bills. As a result, it becomes difficult to establish direct correspondence between sample points in successive bill scans and the discrimination efficiency is adversely affected.

(*Id.*, Col. 7, ll. 8-18.) Once the borderline has been detected, the bill is scanned and light reflection samples are taken from it. (*Id.*, Col. 6, l. 68-Col. 7, l. 5.) Rather than taking samples from the whole bill, the specification says that the device can be adjusted so that "the bill is scanned only across those segments along its narrow dimension which contain the most distinguishable printed indicia relative to the different currency denominations." (*Id.*, Col. 7, ll. 26-29.) For U.S. currency, that segment is "the central, approximately two-inch portion of currency bills, as scanned across the

central section of the narrow dimension of the bill.” (*Id.*, Col. 7, ll. 31-33.) In short, the thrust of the specification is that this scanning technique is superior to others, in part, because it distinguishes between material that is inside and material that is outside the borderline of each bill. Given that context, the phrase “central portion of each bill,” as used in claim 1, could refer to the part of the bill that lies inside the borderline on U.S. currency bills, as plaintiff maintains.

The prosecution history of the ‘196 patent sheds no light on the meaning of the challenged language. The specification of a descendent of the ‘196 patent, however, does. *See Microsoft Corp.*, 357 F.3d at 1349-50 (sanctioning the use of statements in subsequent, related patent applications to construe claims in earlier patents). U.S. Patent 6,381,354 (“the ‘354 patent”) claims a currency identification system that identifies currency bills of different countries. In relevant part, the specification of that patent states:

In adapting the currency discriminating method and apparatus disclosed in U.S. Pat. No. 5,295,196 to optimize the scanning of currencies from countries other than the United States, it is first noted that while it has been found that scanning along the central portion of the green side of U.S. bills provides good patterns to discriminate between the different U.S. denominations, foreign bills may require scanning along segments located in locations **other than the center** and the desirable areas to scan bills can vary from bill-type to bill-type. For example, it may be determined that it is desirable to scan a German marks in the forward direction along a segment 1 inch (2.54 cm) to the left of center along the top face of the bill while it may be desirable to scan British pounds along a segment 1.5 inches (3.81 cm) to the right of center.

(Dariush Adli Decl. Supp. Defs.’ Replies Mot. Partial Summ. J. ‘196 & ‘806 Patents, Ex. F, ‘354 Patent, Col. 9, ll. 48-62) (emphasis added); *see id.*, Fig. 4 (depicting a U.S. bill being scanned in its geometric center and other bills being scanned in different areas).) In this context, the word “center” can mean only one thing: geometric center.

Plaintiff's representation of the scope of the '196 patent, however, runs headlong into the doctrine of claim differentiation. As noted above, that doctrine creates a presumption that each patent claim has a different scope. *Wenger Mfg., Inc.*, 239 F.3d at 1233.

Such is the case with claims 1 and 8. In relevant part, claim 1 recites "a stationary optical scanning head . . . for scanning a preselected segment of a central portion of each bill." (Anderson Decl., Ex. H, '196 Patent, Claim 1, Col. 31, ll. 55-57.) Claim 8 says: "The currency counting and evaluation device of claim 1 wherein said preselected segment of each bill is located in the central region of the bill." (*Id.*, Claim 8, Col. 32, ll. 57-59.) If the phrase "central portion" in Claim 1 means geometric center, as plaintiff's statement to the PTO suggests, then Claim 8 is superfluous.

The doctrine of claim differentiation is not, however, "a hard and fast rule of construction" and cannot be used to "broaden claims beyond their correct scope." *Kraft Foods, Inc. v. Int'l Trading Co.*, 203 F.3d 1362, 1368 (Fed. Cir. 2000) (internal citation omitted). Moreover, "the written description and prosecution history [can] overcome any presumption arising from the doctrine of claim differentiation." *Id.*; see *Tandon Corp. v. U.S. Int'l Trade Comm'n*, 831 F.2d 1017, 1024 (Fed. Cir. 1987) ("Whether or not claims differ from each other, one cannot interpret a claim to be broader than what is contained in the specification and claims as filed."). That is the case here. Plaintiff's unequivocal representation to the PTO that the '196 patent contemplates scanning U.S. currency in the geometric center of each bill overcomes the presumption that claim 1 and claim 8 differ in scope. Thus, the Court construes claim 1 of the '196 as containing the limitation of scanning the geometric center of bills.

Produces and Stores Master Characteristic Patterns

In Glory's view, claim 1 requires that the patented device both generate and store master characteristic patterns that are proportional to the intensity of the light reflected from the scanned bill. Plaintiff concedes that claim 1 requires the patented device to store such patterns, (Pl.'s Mem. Opp'n Defs.' Mot. Partial Summ. J. '196 Patent at 22), but contends that it does not require the device to produce them.

In pertinent part, claim 1 states that the patented device has:

a stationary optical scanning head located between said feed and stacking stations for scanning a preselected segment of a central portion of each bill transported between said stations by said transport mechanism, said scanning head including at least one light source for illuminating a strip of said preselected segment of a bill, and at least one detector for receiving reflected light from the illuminated strip on the bill and producing an output signal representing variations in the intensity of the reflected light, [and]

a memory for storing characteristic signal samples produced by scanning said preselected segments of bills of different denominations with said scanning head and sampling said output signal at said preselected intervals, each of said stored signal samples being proportional to the intensity of the light reflected from a different strip of said preselected segment of a bill.

(Anderson Decl., Ex. H, '196 Patent, Claim 1, Col. 31, ll. 55-65, Col. 32, ll. 5-12.) That language suggests each patented device must have a stationary optical scanning head that produces characteristic signal samples by scanning preselected segments of bills of different denominations, an interpretation echoed by the specification. (*See, e.g., id.*, Col. 2, l. 44-Col. 3, l. 9 (stating that the device's scanning technique is used to produce master characteristic patterns); *id.*, Col. 8, ll. 1-4 ("The optical sensing and correlation technique is based upon using the above process to generate a series of master characteristic patterns using standard bills for each denomination of currency that is to be detected."); *id.*, ll. 9-13 ("The characteristic patterns for each bill are generated from optical

scans, performed on the green surface of the bill and taken along both the ‘forward’ and ‘reverse’ directions relative to the pattern printed on the bill.”.)

That may be what the claim language suggests to a lay person, plaintiff says, but a person skilled in the art would understand it differently. According to plaintiff,

a person of ordinary skill would not interpret the memory element of the ‘196 claims to mean that master characteristics must be generated separately for each and every production unit when the scanning heads are all identical, because that simply does not make any sense. If the scanning heads are identical in all machines, there is clearly no need to generate a new set of master characteristics for each separate production machine.

(Pl.’s Mem. Opp’n Dcfs.’ Mot. Partial Summ. J. ‘196 Patent at 22.) In other words, plaintiff contends that skilled artisans would simply ignore the claim language that requires that the master characteristic samples be produced by the device’s scanning head, and it urges us to do the same.

“[T]he meaning of claim terms must be considered from the perspective of one of ordinary skill in the art, [but] that does not mean that the inventor’s choice of words may be ignored.” *Int’l Rectifier Corp. v. IXYS Corp.*, 361 F.3d 1363, 1371 (Fed. Cir. 2004). Plaintiff could have drafted its claims to disclose a device that is able, but not required, to generate master characteristic patterns, or one that simply stores master characteristic patterns, but it did not. Having failed to do so, we cannot, in the name of claim construction, rewrite its claims to eliminate language plaintiff chose to include. *See Chef Am., Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1374 (Fed. Cir. 2004) (“This court . . . repeatedly and consistently has recognized that courts may not redraft claims whether to make them operable or to sustain their validity.”). The plain language of claim 1 requires the patented device to generate master characteristic patterns.

Using a CPU to Perform the Correlation Algorithm Disclosed in the Patent

Glory's final argument concerns the last element of claim 1, which claims:

signal processing means for receiving said signal samples and (1) determining the denomination of each scanned bill by comparing said stored signal samples with said output signal samples produced by the scanning of each bill with said scanning head, (2) counting the number of scanned bills of each denomination, and (3) accumulating the cumulative value of the scanned bills of each denomination.

(Anderson Decl., Ex. H, '196 Patent, Col. 32, l. 13-20.) The use of the word "means" raises the rebuttable presumption that this element is a means-plus-function limitation. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1369 (Fed. Cir. 2002). "A claim using [the means-plus-function] format will cover only the corresponding step or structure disclosed in the written description, as well as that step or structure's equivalents." *Id.*; see 35 U.S.C. § 112 ¶ 6 ("An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.").

To rebut the means-plus-function presumption, plaintiff offers both intrinsic and extrinsic evidence. The extrinsic evidence is: (1) the testimony of its expert² that the term "signal processing means" would have been understood by those skilled in the art "as identifying a known structure, namely, a signal processor programmed to perform the comparing, counting and accumulating

²Glory says that the expert evidence is irrelevant because the means-plus-function presumption can be overcome only if structure is recited in the claim language itself. The Federal Circuit disagrees. See *CCS Fitness, Inc.*, 288 F.3d at 1369 ("To help determine whether a claim term recites sufficient structure, we examine whether it has an understood meaning in the art."). Thus, expert testimony about the artisans' understanding is relevant to this inquiry.

operations recited in the claim” (Pl.’s Mem. Opp’n Defs.’ Mot. Partial Summ. J. ‘196 Patent at 34); and (2) the testimony of Glory’s expert that skilled artisans would be aware of a number of algorithms, other than that discussed in the ‘196 patent, that could be used to denominate currency. The intrinsic evidence is the patent examiner’s discussion of the O’Maley device in which he equated O’Maley’s “signal processing means” with a CPU and noted that the CPU could be programmed in a variety of ways.

All of that evidence suggests that one skilled in the art would generally equate “signal processing means” with a CPU and that skilled artisans were aware of other algorithms that could perform the denominating function. But none of it addresses the key question, which is: Would a skilled artisan have understood “signal processing means,” as used in claim 1, to refer to a CPU that was programmed in any way to perform the denominating, counting and accumulating functions or to a CPU that was programmed to perform the specific algorithm described in the patent?

The specification of the ‘196 patent and its prosecution history suggest that it is the latter. The specification does not say simply that the CPU is programmed to denominate scanned bills. Rather, it describes in great detail the specific algorithm executed by the CPU to perform that task. (*See* Anderson Decl., Ex. H, ‘196 Patent, Col. 12, l. 3-Col. 13, l. 5.) Moreover, the specification suggests that the algorithm is a critical part of the invention. The specification describes prior art devices as being “incapable of both currency discrimination and counting at high speeds with a high degree of accuracy” in part because they use “complex algorithms” to perform the denomination function. (*Id.*, Col. 1, l. 63- Col. 2, l. 27.) The patented device is an improvement, the specification says, because it uses “a simple correlation procedure” that compares the pattern from a scanned bill

with stored master characteristic patterns to determine the denomination of a bill. (*Id.*, Col. 3, ll. 33-49, Col. 12, ll. 3-7.)

The prosecution history of the '196 patent also suggests that "signal processing means" contemplates a CPU programmed to execute a specific algorithm. To overcome the patent examiner's rejection of its claims as obvious in light of O'Maley, plaintiff said that its system was different from O'Maley's because it compared proportional signal samples from scanned bills to proportional signals stored in memory. (Nelson Decl., Ex. 3, Prosecution History '196 Patent at GL047975.) The proportional signal system was superior, plaintiff said, because it could be normalized according to the algorithm set forth in the patent. (*Id.*)

Given the intrinsic evidence, the Court is not persuaded that a person with ordinary skill in the design and manufacture of currency denomination devices would equate "signal processing means," as it is used in claim 1, with a CPU that is programmed in any manner to denominate, count and accumulate the total value of currency. Because plaintiff has not rebutted the means-plus-function presumption, we will analyze the "signal processing means" limitation in accordance with 35 U.S.C. § 112 ¶ 6.

In construing a limitation pursuant to that section, we must first determine what the claimed function is and then identify the structures disclosed in the specification that perform that function. *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1087 (Fed. Cir. 2003). The functions performed by the "signal processing means" are: determining the denomination of each scanned bill by comparing stored signal samples with signal samples obtained from the scanned bill, counting the number of scanned bills of each denomination and accumulating the value of the scanned bills of each

denomination. (Anderson Decl., Ex. H, '196 Patent, Col. 32, ll. 14-21.) The parties agree that the corresponding structure is:

[A] CPU programmed to perform the correlation algorithm of the '196 patent (or a structural equivalent) that compares stored master characteristic patterns, which are proportional to the light intensity reflected from standard bills, with the scanned bill pattern that is proportional to the light intensity reflected from the scanned bill.

(Pl.'s Mem. Opp'n Defs.' Mot. Partial Summ. J. '196 Patent at 36.)

Literal Infringement

Having construed the claim limitations, we must now determine whether Glory's products infringe the claims of the '196 patent either literally or under the doctrine of equivalents. Glory is guilty of literal infringement if its machines contain every limitation of the asserted claims. *Kraft Foods, Inc.*, 203 F.3d at 1370. Thus, given the Court's construction of the claims, Glory's S machines literally infringe only if they: (1) have one or more transport path and output pocket; (2) scan the geometric center of each bill; (3) generate and store master characteristic patterns proportional to the intensity of the light reflected from scanned bills; and (4) use a CPU programmed to perform the algorithm disclosed by the '196 patent or its equivalent. *See Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1267 (Fed. Cir. 1999) (stating that means-plus-function element is literally infringed if the accused device performs the same function and has the same or equivalent structure).

The undisputed evidence establishes that the Glory S machines do not contain all of those limitations. Though the machines have at least one transport path and output pocket, they do not scan the geometric center of bills. Rather, it is undisputed that they scan segments that are

substantially off-center. (Tomiya Decl. Supp. Defs.’ Mot. Partial Summ. J. ‘196 Patent (hereafter, “Tomiya Decl.”) ¶ 5.)

The parties dispute whether Glory’s machines generate and store master characteristic patterns that are proportional to light reflected from standard bills. Glory says that its machines do not scan genuine bills to obtain reference data. (*Id.* ¶ 24.) Rather, Glory says, they scan unknown bills, retrieve data from them and apply that data to a series of formulas stored in the memory of each machine to determine the denomination of the bill. (*Id.* ¶¶ 4-15, 27.)

But, as plaintiff notes, and Glory’s documents confirm, the formulas the Glory S machines use to determine denominations are derived from data Glory obtains from scanning genuine bills. (*See* Anderson Decl., Ex. J at GL003244 (Glory document stating that its master patterns, which are tables of formulas used to determine denominations, are derived from data “retrieved by running 50 [genuine] notes” of each denomination”).) Because that data is retrieved by scanning, it must, as plaintiff points out, “reflect[] the intensity of the light reflected from the bill.” (*Id.*, Ex. F, Stevenson Decl. Supp. Pl.’s Opp’n Defs.’ Mot. Partial Summ. J. ‘196 Patent (hereafter, “Stevenson Decl.”) ¶¶ 37-38.) Thus, plaintiff says, the Glory S machines store master patterns, *i.e.* the formulas, which are proportional to light reflected from standard bills.

Plaintiff’s argument equates the data Glory uses to create the formulas with the formulas themselves. The data consists of signals of light reflected from genuine bills. (*Id.*, Ex. J at GL003244.) The formulas are derived from those signals, but it is the formulas, not the signals, that are stored in the memory of Glory’s S machines. (*Id.*; Tomiya Decl. ¶ 25.)

Plaintiff says that is a distinction without a difference:

The point of both the Cummins claimed invention and the Glory machine[s] is to manipulate raw data from genuine bills in order to put the data in a format which will allow the data to be processed quickly using a denomination algorithm. Whether you average and normalize the data or rearrange it and multiply it, the fact is that the only data actually stored on the Glory machines comes from scanning genuine bills – the same data which is claimed to be a master characteristic pattern in the Cummins’ patents. Applying a mathematical formula to that data doesn’t change the inherent nature of the data – the data stored on the Glory machines is still a master characteristic pattern as claimed and described in the ‘196 patent.

(Anderson Decl, Ex. F, Stevenson Decl. ¶ 41.)

It may be, as plaintiff asserts, that Glory’s formulas and Cummins’ master characteristic patterns are equivalent. But given the dearth of evidence about what Glory does, if anything, to the data it obtains from the genuine bills to generate its formulas and the conflicting testimony of the parties’ experts, it is an issue we cannot decide. As the non-movant, plaintiff is entitled to have the disputed fact resolved in its favor. Thus, plaintiff has raised a genuine issue of material fact as to whether Glory’s formulas constitute master characteristic patterns within the meaning of claim 1.

Even if they do, however, the Glory S machines still do not infringe that element because it is undisputed that the individual machines do not generate the formulas. (Tomiya Decl. ¶ 15; Anderson Decl., Ex. F, Stevenson Decl. ¶ 42.) Thus, Glory’s S machines do not infringe this element of claim 1, even if the formulas constitute master characteristic patterns.

That leaves the last claim element: a CPU programmed to perform the algorithm disclosed in the ‘196 patent or its equivalent. There is no dispute that the Glory machines do not perform precisely the same algorithm as the patented device. But plaintiff contends that the pattern classification technique used by the Glory S machines performs the same function and uses an equivalent structure such that the machines literally infringe this element.

The structure of an accused device is equivalent to that disclosed in a patent if the differences between the two are insubstantial. *Odetics, Inc.*, 185 F.3d at 1267. The differences are insubstantial “if the assertedly equivalent structure performs the claimed function in substantially the same way to achieve substantially the same result as the corresponding structure described in the specification.” *Id.* According to the specification of the ‘196 patent, the way the patented device denominates currency is by “comparing . . . stored signal samples with . . . output signal samples produced by the scanning of each bill with [the] scanning head.” (Anderson Decl., Ex. H, ‘196 Patent, Claim 1, Col. 32, ll. 16-18.) As discussed above, the parties dispute whether the Glory S machines compare stored samples with samples obtain from scanned bills. Thus, plaintiff has raised a genuine issue of fact as to whether the Glory S Machines literally infringe the means-plus-function element of claim 1.

Infringement Under The Doctrine of Equivalents

Even if the accused devices do not literally infringe the ‘196 patent, they may still infringe under the doctrine of equivalents. Glory’s S machines infringe under that doctrine if they “perform[] substantially the same function in substantially the same way to achieve substantially the same result” as the claimed invention. *Kraft Foods, Inc.*, 203 F.3d at 1371. Glory’s machines infringe under the doctrine of equivalents only if they contain the equivalent of every claim element. *Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997).

The Glory S Machines do not contain the equivalent of the claim 1 element that requires scanning the geometric center of each bill. It is undisputed that the Glory machines scan segments of bills that are substantially off-center. (Tomiya Decl. ¶ 5.) Plaintiff does not argue that Glory’s S machines scan unknown bills in substantially the same way as the patented device, and thus, the

Court finds that they do not. Consequently, Glory's machines do not infringe the scanning element under the doctrine of equivalents.

Glory contends that plaintiff is barred from invoking the doctrine of equivalents to show infringement of the production and storage of master characteristic patterns claim element. Glory says that during the prosecution of the '196 patent, plaintiff specifically limited its claim to master characteristic patterns that are proportional to the intensity of light reflected from standard bills.

Claim 1, as plaintiff initially submitted it to the PTO, claimed a currency counting and evaluation device comprising, among other things, "sampling said output signal at preselected intervals as a bill is moved across said scanning head in the direction of the narrow dimension of the bill," and "a memory for storing characteristic signal samples produced by scanning said preselected segments of bills of different denominations with said scanning head and sampling said output signal at said preselected intervals." (Nelson Decl., Ex. 3, Prosecution History '196 Patent at GL047894.) The PTO rejected that claim as unpatentable over the prior art O'Maley device. (*Id.* at GL047946-52.)

To overcome that rejection, plaintiff amended those elements of claim 1 to include the italicized language:

means for sampling said output signal at preselected intervals as a bill is moved across said scanning head in the direction of the narrow dimension of the bill, each of said output signal samples being proportional to the intensity of the light reflected from a different strip of said preselected segment of a bill"; and

a memory for storing characteristic signal samples produced by scanning said preselected segments of bills of different denominations with said scanning head and sampling said output signal at said preselected intervals, *each of said stored signal samples being proportional to the intensity of the light reflected from a different strip of said preselected segment of a bill.*

(*Id.* at GL047972) (emphasis in original) Plaintiff explained the amendment as follows:

The O'Maley Patent 4,179,685 describes a currency identification system which moves the bills in the direction of the long dimension of the bills. As each bill is advanced, it traverses an array of "scanners" 62, each of which includes a light source and a light sensor. The output of each sensor is read as successive "bits" at time intervals determined by clock pulses from a clock-pulse generator 70. These output bits are supplied through a parallel-serial converter 80 to a series of exclusive OR gates 90-96 which also receive stored bits from corresponding PROMs 82-88. . . .

Thus, each scanning device 62 produces a "bit," which is either a one or a zero; that bit is compared with a pre-stored bit from each of the four PROMs; and the resulting coincident pulses from each of the four gates are counted in a corresponding counter until one of the counters reaches a preselected number. . . .

Unlike O'Maley, applicants' system illuminates a transverse strip of the bill as the bill traverses the scanning head. The scanner detects light reflected from the illuminated strip and produces an electrical output signal which is proportional to the intensity of the reflected light. Successive samples of this signal, corresponding to successive illuminated strips on the advancing bill, are stored in memory. This is fundamentally different from the multiple "bits" used in the O'Maley system. Applicants' *proportional* signal samples are compared with similar *proportional* signals stored in a memory, to determine the denomination of the bill. The use of these proportional signals is a significant improvement over O'Maley's "bit" system, and permits fast and accurate recognition of the denomination of the bill, regardless of the condition of the bill. This is extremely important in high speed currency counters which typically process bills at rates in excess of 800 bills per minute (as recited in claim 1), and often at rates of 1000 bills per minute or higher.

Because applicants' system uses proportional signal samples rather than just bits, the samples for a given bill can be normalized so as to compensate for the condition of the bill

The use of the proportional signal samples also makes possible the use of the "shifting" process illustrated in FIGS. 10A-10E of applicants' drawings This shifting process can compensate for bill shrinkage, for example.

In short, applicants' use of proportional signal samples permits the use of a variety of data processing techniques which can enhance the ability of the system to reliably identify the denominations of bills regardless of their condition.

The aforementioned feature of applicants' invention has been brought into sharper focus in independent claim 1 by amending the claim to specifically recite that each

of the signal samples is “proportional to the intensity of the light reflected from a different strip of said preselected segment of a bill.” This same language has been added to the description of the stored signal samples which are used for comparison with the signal samples produced for the bill being scanned.

(*Id.* at GL047973-75) (emphasis in original). Glory says that, as a result of that exchange, plaintiff narrowed the master characteristic pattern element of claim 1 solely to patterns that are proportional to the intensity of light reflected from scanned bills.

Glory’s argument is based on the doctrine of prosecution history estoppel, which “requires that the claims of a patent be interpreted in light of the proceedings in the PTO during the application process.” *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 733 (2002). Prosecution history estoppel prevents the patentee from “recaptur[ing] in an infringement action the very subject matter surrendered as a condition of receiving the patent.” *Id.* at 734. If a patentee “originally claimed the subject matter alleged to infringe but then narrowed the claim in response to a rejection, he may not argue that the surrendered territory comprised unforeseen subject matter that should be deemed equivalent to the literal claims of the issued patent.” *Id.* at 733-34.

Prosecution history estoppel does not, however, bar a patentee from asserting infringement against all equivalents to an amended element. *Id.* at 737. Rather, “[a] patentee’s decision to narrow his claims through amendment” gives rise to a presumption that he disclaimed all of “the territory between the original claim and the amended claim.” *Id.* at 740. The patentee may rebut that presumption by showing that the alleged equivalent was “unforeseeable at the time of the application,” that “the rationale underlying the amendment . . . bear[s] no more than a tangential relation” to the alleged equivalent or that there is “some other reason that the patentee could not reasonably have been expected to have described” the alleged equivalent. *Id.* at 740-41.

Plaintiff does not argue that Glory's alleged equivalent was unforeseeable at the time it amended claim 1. Nor does it contend that the alleged equivalent relates to aspects of the invention that are peripheral to the reason for the amendment. It argues, however, that the amendment cannot reasonably be construed as describing the alleged equivalent because the purpose of the amendment was "to demonstrate the patentability of [plaintiff's] invention over the 'bit' system of the O'Maley patent." (Pl.'s Mem. Opp'n Defs.' Mot. Partial Summ. J. '196 Patent at 29.) Thus, plaintiff says, the only equivalent it gave up was for bit systems, which the Glory S machines do not use.

The Court disagrees. Plaintiff did not distinguish O'Maley's system simply on the grounds that it was bit-based. Rather, plaintiff said that O'Maley's use of bits made his system less able to account for variations in bills, and thus, slower and less accurate, than plaintiff's system. (Nelson Decl., Ex. 3, Prosecution History '196 Patent at GL047974-95.) The enhanced accuracy and speed of its system, plaintiff said, was due solely to the fact that its system uses signal samples, from both genuine and unknown bills, that are proportional to the intensity of the light reflected from the bill. (*Id.*) Thus, plaintiff amended claim 1 to include that limitation. (*See id.* at GL047974-95 (stating that claim was amended "to specifically recite that each of the signal samples is 'proportional to the intensity of the light reflected from a different strip of said preselected segment of a bill'").)

Given the context of plaintiff's representations to the PTO, the Court finds that plaintiff's amendment of claim 1 from reciting "a memory for storing characteristic signal samples produced by scanning said preselected segments of bills," (*id.* at GL047894), to "a memory for storing characteristic signal samples produced by scanning said preselected segments of bills . . . each of said stored signal samples being proportional to the intensity of the light reflected from a different strip

of said preselected segment of a bill,” (*id.* at GL047972), estops plaintiff from establishing infringement of that element under the doctrine of equivalents.

The doctrine of equivalents analysis for the last element, a CPU programmed to perform the algorithm disclosed in the ‘196 patent, is similar, though not identical, to the literal infringement analysis. *Odetics, Inc.*, 185 F.3d at 1267. As discussed above, the Glory S machines literally infringe the means-plus-function element if they perform the same function as the patented device and have the same or equivalent structure. *Id.* To infringe under the doctrine of equivalents, Glory’s S machines must perform substantially the same function as the patented device, in substantially the same way to obtain substantially the same result. *Kraft Foods, Inc.*, 203 F.3d at 1371.

Though the analyses are slightly different, the results are the same. Whether the Glory S machines denominate currency in substantially the same way as the patented device is a disputed question of fact that cannot be decided by the Court on a summary judgment motion.

Summary


Claim 1 of the ‘196 patent requires, among other things, that the patented device scan the geometric center of bills. It is undisputed that the Glory S machines do not scan the geometric center of bills, and plaintiff does not argue that Glory’s scanning method is equivalent to scanning the geometric center. Thus, though plaintiff has raised a genuine issue of fact as to Glory’s infringement of other elements of claim 1, the fact that the Glory S machines do not use the same or an equivalent scanning method precludes a finding of literal infringement or infringement under the doctrine of equivalents.

Conclusion

For the foregoing reasons, Glory's motion for partial summary judgment of noninfringement of the '196 patent [doc. no. 216] is granted.

SO ORDERED.

ENTERED: MAR 28 2005


HON. RONALD A. GUZMAN
United States District Judge